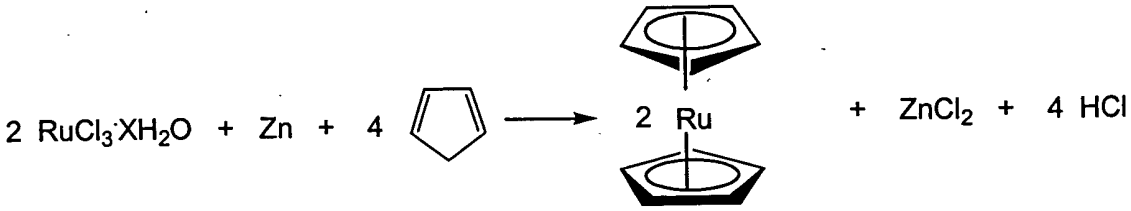

Fig.1A
Prior Art

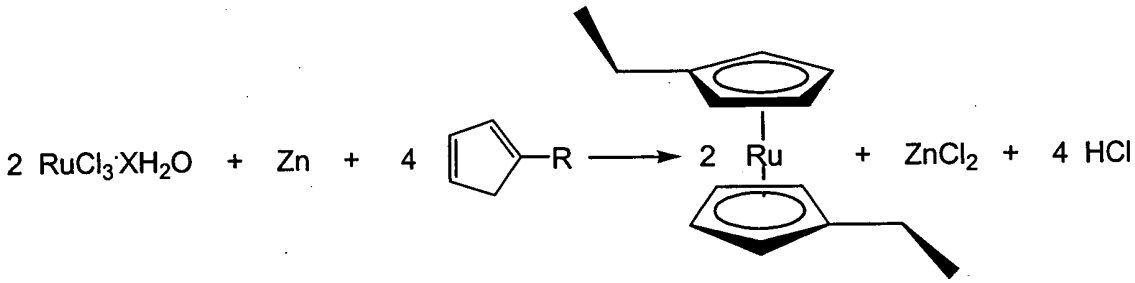

Fig.1B
Prior Art

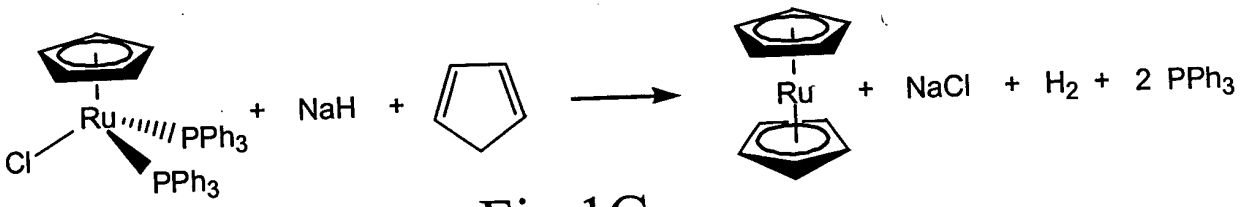

Fig.1C
Prior Art

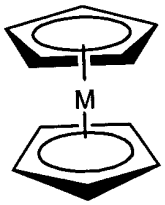

Fig. 2A

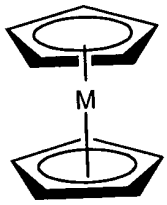

Fig. 2B

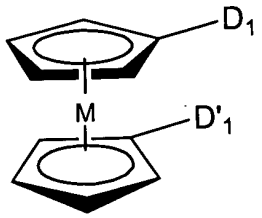

Fig. 3

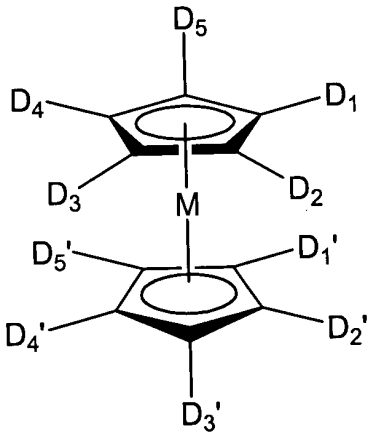

Fig. 4

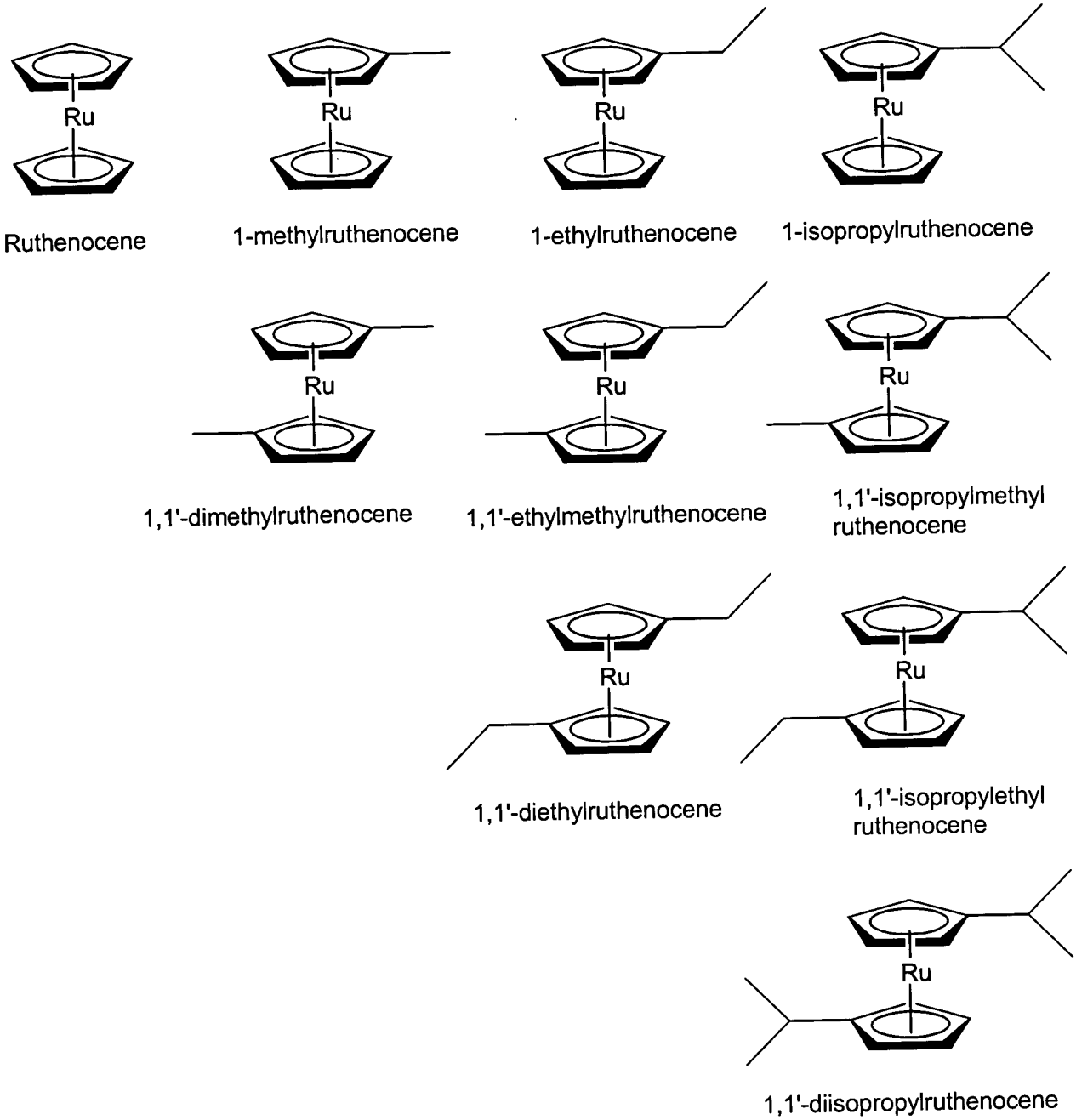
Ru
Ruthenocene
1-methylruthenocene
1-ethylruthenocene
1-isopropylruthenocene
1,1'-dimethylruthenocene
1,1'-ethylmethylruthenocene
1,1'-isopropylmethyl ruthenocene
1,1'-diethylruthenocene
1,1'-isopropylethyl ruthenocene
1,1'-diisopropylruthenocene

Fig. 5

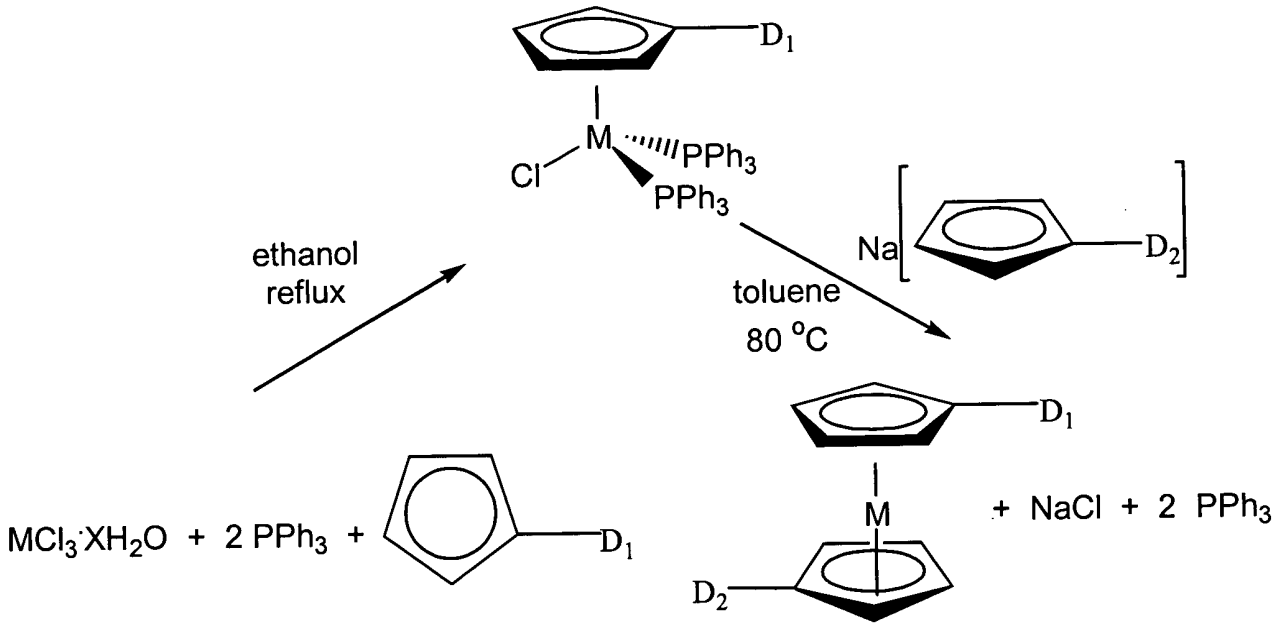
D1
M
Cl
PPh3
PPh3
ethanol
reflux
Na
D2
toluene
80 °C
D1
MCl3·XH2O + 2 PPh3 +
D1
M
D2
+ NaCl + 2 PPh3

Fig. 6

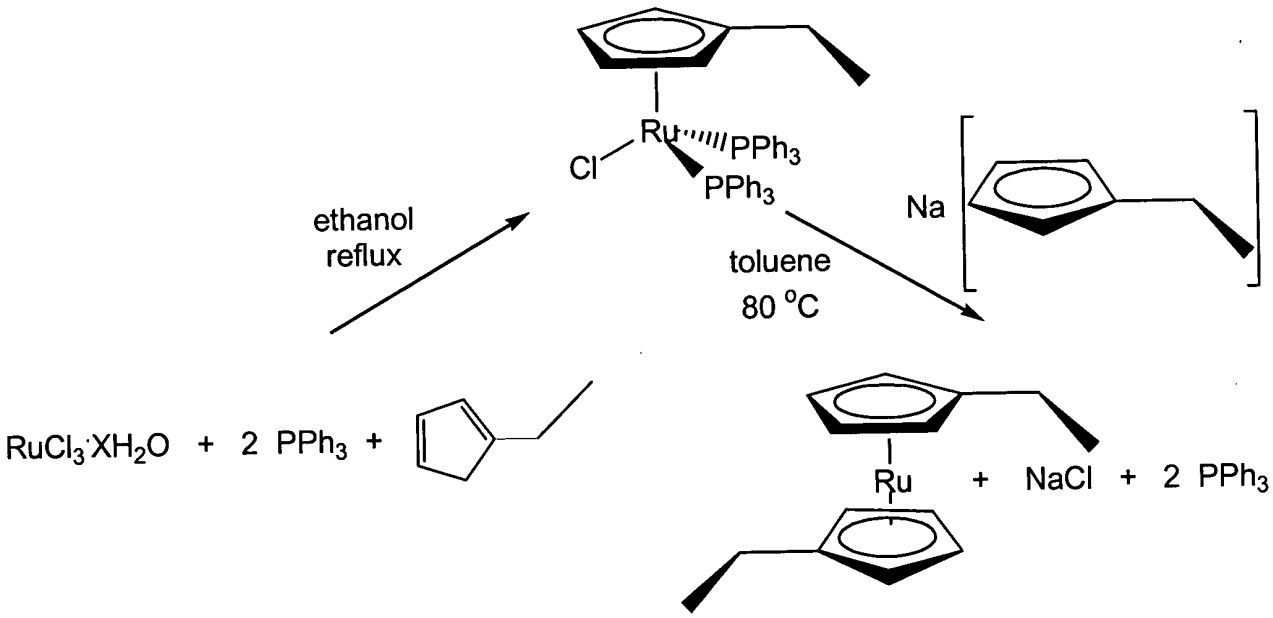
Ru
Cl
PPh3
PPh3
ethanol
reflux
toluene
80 °C
Na
RuCl3·XH2O + 2 PPh3 +
Ru
+ NaCl + 2 PPh3

Fig. 7

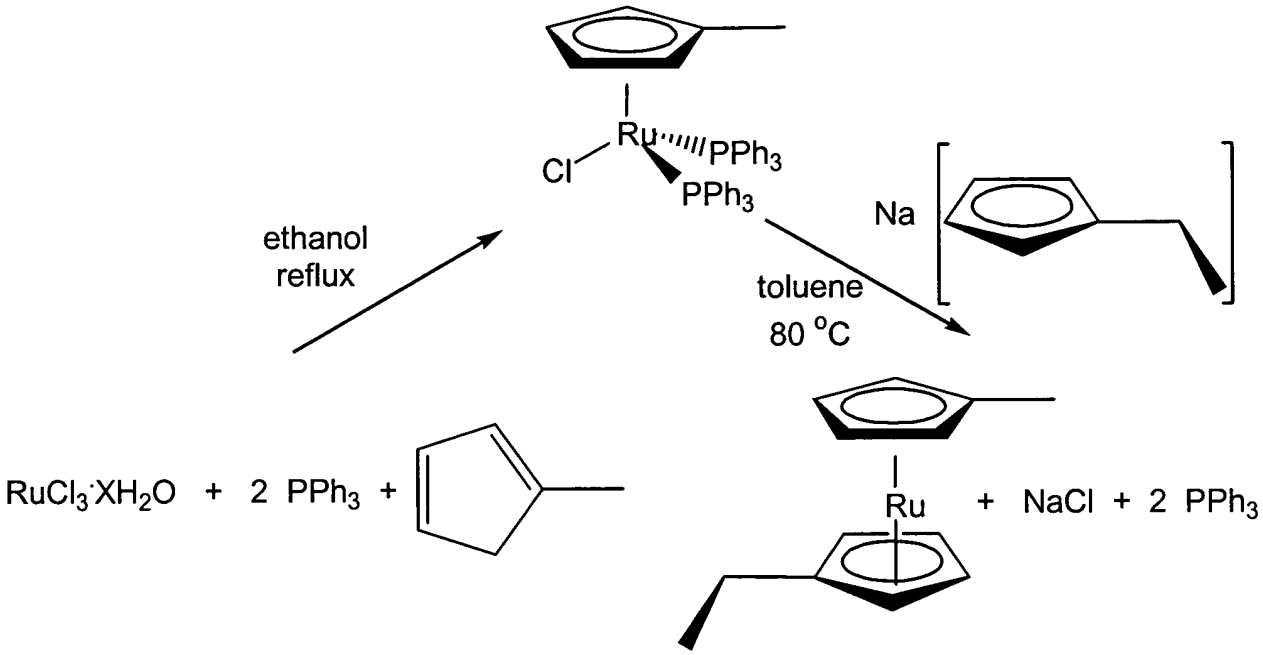
Ru
Cl
PPh3
PPh3
ethanol
reflux
toluene
80 °C
Na
RuCl3·XH2O + 2 PPh3 +
Ru
+ NaCl + 2 PPh3

Fig. 8

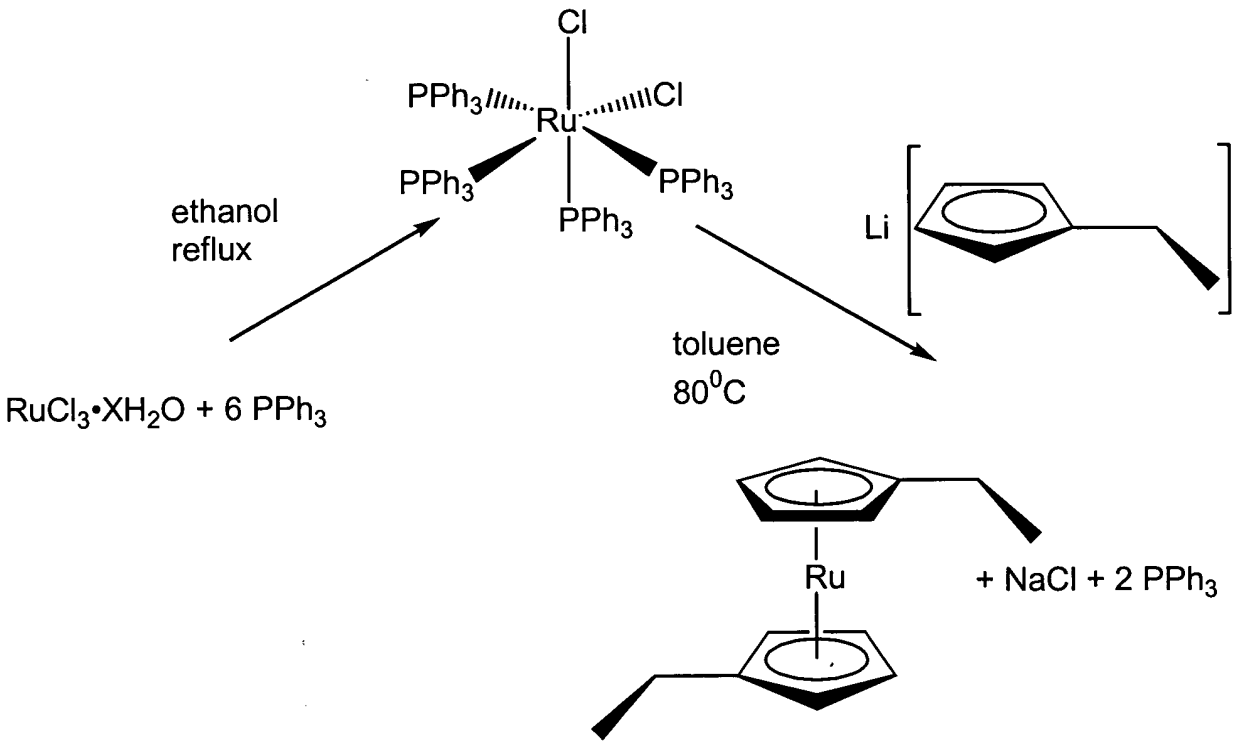
Cl
PPh3
Ru
Cl
PPh3
PPh3
PPh3
ethanol
reflux
Li
toluene
80°C
RuCl3•XH2O + 6 PPh3
Ru
+ NaCl + 2 PPh3

Fig. 9